

# THE ASTROPHYSICAL JOURNAL

An International Review of Spectroscopy and  
Astronomical Physics

## EDITORS

GEORGE E. HALE  
*Mount Wilson Observatory of the Carnegie  
Institution of Washington*

EDWIN B. FROST  
*Yerkes Observatory of the  
University of Chicago*

HENRY G. GALE  
*Ryerson Physical Laboratory of the  
University of Chicago*

## COLLABORATORS

WALTER S. ADAMS, *Mount Wilson Observatory*; JOSEPH S. AMES, *Johns Hopkins University*; ARISTARCH  
BELOPOLSKY, *Observatoire de Poulkova*; WILLIAM W. CAMPBELL, *Lick Observatory*; HENRY CREW,  
*Northwestern University*; CHARLES FABRY, *Université de Paris*; ALFRED FOWLER, *Imperial  
College, London*; CHARLES S. HASTINGS, *Yale University*; HEINRICH KAYSER,  
*Universität Bonn*; ALBERT A. MICHELSON, *University of Chicago*; HUGH F.  
NEWALL, *Cambridge University*; ALFRED PEROT, *Paris*; CARL  
RUNGE, *Universität Göttingen*; HENRY N. RUSSELL, *Princeton  
University*; SIR ARTHUR SCHUSTER, *Twynford*; FRANK  
SCHLESINGER, *Yale Observatory*

## VOLUME LXI

JANUARY-JUNE 1925



THE UNIVERSITY OF CHICAGO PRESS  
CHICAGO, ILLINOIS

THE CAMBRIDGE UNIVERSITY PRESS, LONDON  
THE MARUZEN-KABUSHIKI-KAISHA, TOKYO, OSAKA, KYOTO, FUKUOKA, SENDAI  
THE MISSION BOOK COMPANY, SHANGHAI

Published  
January, March, April, May, June, 1925

Composed and Printed By  
The University of Chicago Press  
Chicago, Illinois, U.S.A.

Gen (astr. obs)  
Wahr

## CONTENTS

### NUMBER I

	PAGE
ERNEST FOX NICHOLS. Philip Fox . . . . .	I
JOINING THE INFRA-RED AND ELECTRIC WAVE SPECTRA. E. F. Nichols and J. D. Tear . . . . .	17
NEW REGULARITIES IN THE SPECTRA OF THE ALKALINE EARTHS. H. N. Russell and F. A. Saunders . . . . .	38
ON THE ABERRATION OF LIGHT. Leigh Page . . . . .	70

### NUMBER II

OBSERVATIONS OF THE TOTAL SOLAR ECLIPSE OF SEPTEMBER 10, 1923, BY THE SPROUL OBSERVATORY. John A. Miller and Ross W. Marriott	73
GRAVITATIONAL FORCES IN SPIRAL NEBULAE. Ernest W. Brown . . .	97
THE MEAN COLOR-INDEX OF STARS OF DIFFERENT APPARENT MAGNI- TUDES. Frederick H. Seares . . . . .	114
INVESTIGATIONS ON PROPER MOTION, ELEVENTH PAPER. Adriaan van Maanen . . . . .	130

### NUMBER III

THE EFFECT OF THE EARTH'S ROTATION ON THE VELOCITY OF LIGHT, I. A. A. Michelson . . . . .	137
THE EFFECT OF THE EARTH'S ROTATION ON THE VELOCITY OF LIGHT, II. A. A. Michelson and Henry G. Gale . . . . .	140
THE PROPERTIES OF TUNGSTEN AND THE CHARACTERISTICS OF TUNGSTEN LAMPS. W. E. Forsythe and A. G. Worthing . . . . .	146
A STUDY OF ELECTRICALLY EXPLODED WIRES. Sinclair Smith . . . .	186

#### REVIEWS:

*Probleme der Astronomie. Festschrift für Hugo v. Seeliger dem For-  
scher und Lehrer zum Fünfundsechzigsten Geburtstage* (George C.  
Comstock), 204.—*Astronomie*, edited by J. Hartmann (E. B. F.),  
205.—*Observations of the Total Solar Eclipse of January 24, 1925,  
Made by Electric Companies Affiliated with the Consolidated Gas  
Company of New York* (E. B. F.), 207.—*The Natural History of  
Crystals*, A. E. H. Tutton (A. N. Winchell), 208.

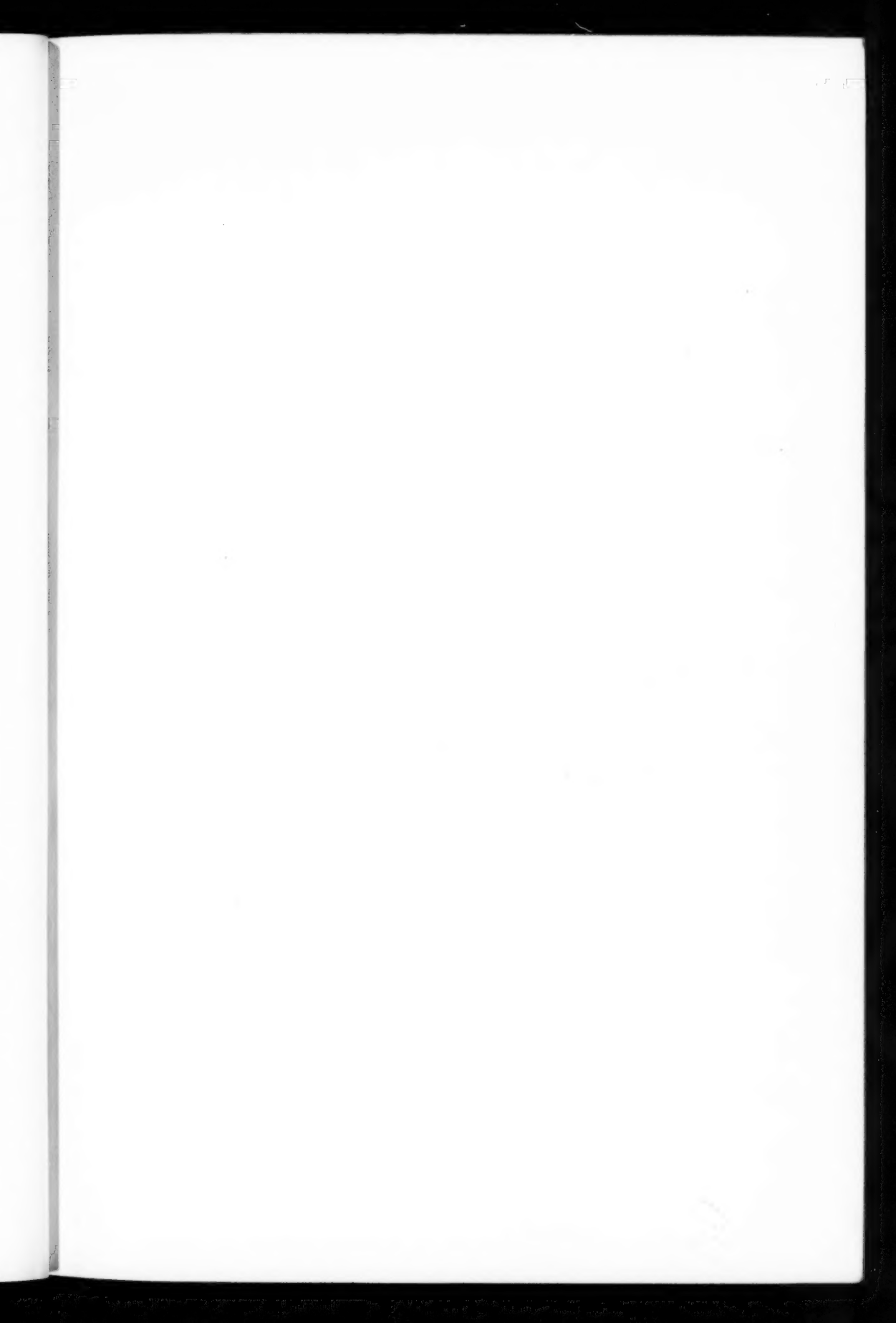
THE SOLAR PHYSICS COMMITTEE . . . . .	208
---------------------------------------	-----

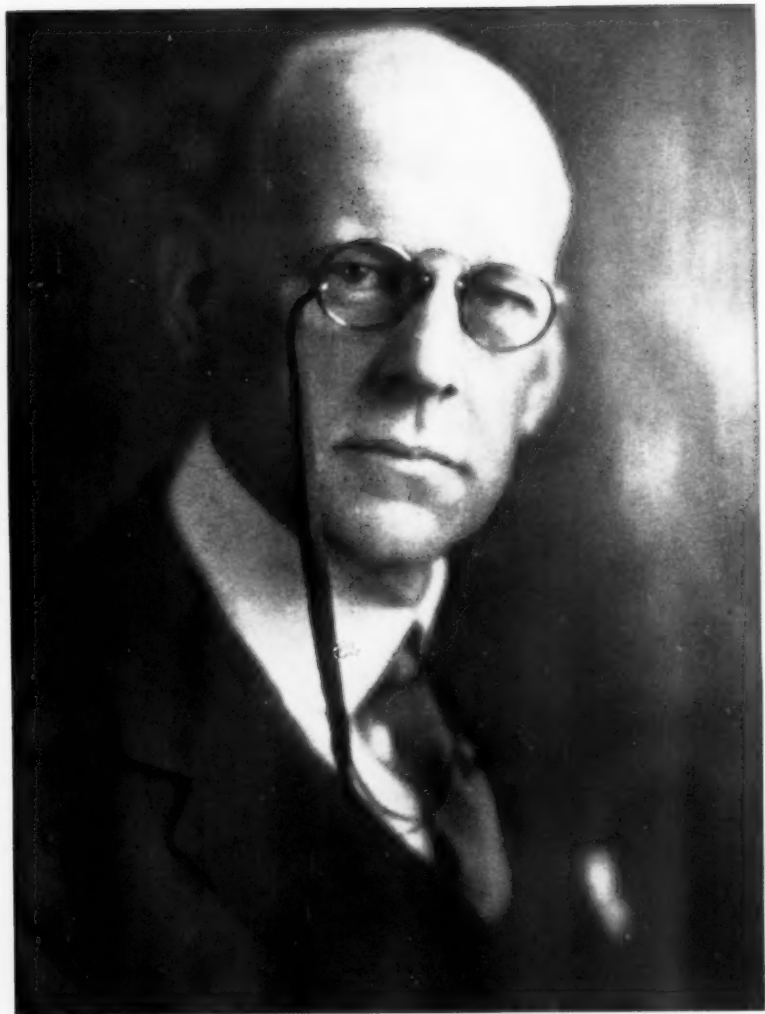
## NUMBER IV

	PAGE
ENERGY LEVELS IN BAND SPECTRA. O. S. Duffendack . . . . .	209
A LIST OF ULTIMATE AND PENULTIMATE LINES OF ASTROPHYSICAL INTEREST. Henry Norris Russell . . . . .	223
REDUCTION OF THE HARVARD-GRONINGEN <i>Durchmusterung</i> TO THE INTERNATIONAL SYSTEM OF MAGNITUDE AND COLOR. Frederick H. Seares, Mary C. Joyner, and Myrtle L. Richmond . . . . .	284
SOME RELATIONS BETWEEN MAGNITUDE SCALES. Frederick H. Seares . . . . .	301
THE ORBITS OF FOUR SPECTROSCOPIC BINARIES. R. F. Sanford . . . . .	320
REVIEWS:	
<i>Helmholtz' Treatise on Physiological Optics</i> , edited by James P. C. Southall (Lucien Howe), 333.— <i>Crystals and the Fine Structure of Matter</i> , Friedrich Rinne (A. N. Winchell), 335.	

## NUMBER V

CHARACTERISTICS OF PHOTOGRAPHIC DESENSITIZERS AND DISTORTIONS ON PLATES DUE TO LOCAL DESENSITIZING. Frank E. Ross . . . . .	337
ANALYSIS OF RADIAL VELOCITIES OF GLOBULAR CLUSTERS AND NON-GALACTIC NEBULAE. Gustaf Strömberg . . . . .	353
THE ASYMMETRY IN STELLAR MOTIONS AS DETERMINED FROM RADIAL VELOCITIES. Gustaf Strömberg . . . . .	363
DISCOVERY AND OBSERVATIONS OF STARS OF CLASS Be. Paul W. Merrill, Milton L. Humason, and Cora G. Burwell . . . . .	389
TWO STELLAR SPECTRA OF THE P CYGNI TYPE. Paul W. Merrill . . . . .	418
THE THEORY OF THE STELLAR ABSORPTION COEFFICIENT. S. Rosseland . . . . .	424
REVIEWS:	
<i>The Physics of the Developed Photographic Image</i> , F. E. Ross (H. T. Stetson), 443.— <i>Einführung in das Studium der veränderlichen Sterne</i> , Karl Schiller (Caroline E. Furness), 446.— <i>The Earth, Its Origin, History and Physical Constitution</i> , Harold Jeffreys (Walter D. Lambert), 448.— <i>The Atom and the Bohr Theory of Its Structure</i> , H. A. Kramers and Helge Holst (Frank C. Hoyt), 453.	
JOHN ADELBERT PARKHURST . . . . .	454
INDEX . . . . .	455





ERNEST FOX NICHOLS